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stay connected

Manual IMPACT67-DN

- Installation
- Configuration Notes
- Startup
- Diagnostics
- Technical Data

Publishing Data

User Manual for

IMPACT67 DN DI16 (Article Number: 55071)

IMPACT67 DN DI8 DO8 (Article Number: 55072)

IMPACT67 DN DO8 (Article Number: 55073)

IMPACT67 DN DO16 (Article Number: 55074)

Version 1.4
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Service & Support

Website:

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In addition, our Customer Service Center (CSC) will be glad to assist you:

Our Customer Service Center can support you throughout your project: planning and the conception of customer applications, configuration, installation, and startup. We also offer competent consulting or – in more complex cases – we even provide direct onsite support.

The Customer Service Center provides support tools. It performs measurements for fieldbus systems, such as Profibus DP, DeviceNet, CanOpen, and AS interface, as well as energy, heat, and EMC measurements.

Our coworkers at the Customer Service Center provide their competence, know-how, and years of experience. They are knowledgeable about hardware and software, and compatibility with products made by various manufacturers.

You can contact the Customer Service Center at

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or by email at csc@murrelektronik.de.

About the User Manual and its Structure

Bus Manual:
General explanations and functions for each bus.

On this subject, please click on the links to the next page.

System/Product Manuals:
Describe the system and product-specific features.

Art. No.	Designation
55364	Impact67 ProfiBus
55365	Impact67 CanOpen
55367	Impact67 DeviceNet
55368	Impact67 EtherNet/IP
55369	Impact67 EtherCat

www.murrelektronik.com

Here are links to the bus user manuals:

>>> DeviceNet (www.odva.org)

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Important Information

Symbols and Icons

This manual contains information and instructions you must comply with in order to maintain safety and avoid personal injury or damage to property. They are identified as follows:

Notes indicate important information.

Warnings contain information that, if you ignore this information, may cause damage to equipment or other assets or, if you fail to comply with safety precautions, may constitute a danger to the user's health and life.

These instructions are recommendations issued by Murrelektronik.

Intended Purpose

Before starting the devices, read this manual carefully. Keep it in a location that is accessible to all users at all times.

The products that are described in this manual were developed, manufactured, tested, and documented in compliance with the relevant safety standards. In normal cases, these products do not constitute any danger to persons or objects, provided the handling specifications and safety instructions described in this manual are observed. They conform to the requirements of

- EMC Directive (2004/108/EC)

The products are designed for industrial use. An industrial environment is defined as one in which loads are not connected directly to the public low-voltage power grid. Additional measures must be taken if the products are used in private, business, or trade environments.

The safe, troublefree functioning of the products requires proper transportation, storage, mounting, and installation, and careful operation. Operation of the devices for their intended purposes is only guaranteed when the enclosures are fully mounted. If aggressive media are used, check their material resistance depending on the application.

Current safety and accident prevention laws valid for a specific application must be observed for the configuration, installation, setup, maintenance, and testing of the devices. The power supply must

comply with SELV or PELV. Power sources in accordance with EN 61558-2-6 (transformer) or EN 60950-1 (switched-mode power supply) meet these requirements.

Only use cables that meet the requirements and regulations for safety, electromagnetic compatibility, and, if necessary, telecommunications terminal equipment specifications.

Information on the cables and accessories that are suitable for use with this product are contained in the Section 3.1 of this manual.

Qualified Personnel

Only qualified, trained electricians knowledgeable in the safety standards of automation systems may configure, install, set up, maintain, and test the devices. The requirements concerning qualified personnel are dependent on the requirements profiles described in ZVEI and VDMA. For this reason, electricians must know the contents of the manual "Weiterbildung in der Automatisierung" (Further Training in Automation Systems) published by ZVEI and VDMA published by Maschinenbau-Verlag, Post Box 710864, 60498 Frankfurt, Germany) before installing and maintaining the devices. They are therefore electricians who are capable of assessing the work executed and any possible dangers arising from this due to their professional training, knowledge, experience, and their knowledge of the pertinent standards; or who have a level of knowledge equivalent to professional training due to their many years of activity in a comparable field.

Only Murrelektronik technical personnel are allowed to execute work on the hardware and software of our devices, if they are devices not described in this manual.

Unqualified tampering with the hardware or software, or failure to observe the warnings cited in this manual may result in severe personal injury or damage to property.

1. Description of IMPACT67

Fieldbus modules with IP67 protection are an important module in machine installation and they replace complex wired, and therefore, high-cost terminal boxes. Fieldbuses replace conventional parallel wiring.

An increase in efficiency in installation systems was the prime motivator in developing the IMPACT67. Concentration on what is important, coupled with purposeful connectivity, is our recipe for success to reduce your installation costs.

- Application-specific: compact and dense
- Installation-friendly: well designed and pluggable
- Economic: minimized to what is important

System Design Principle

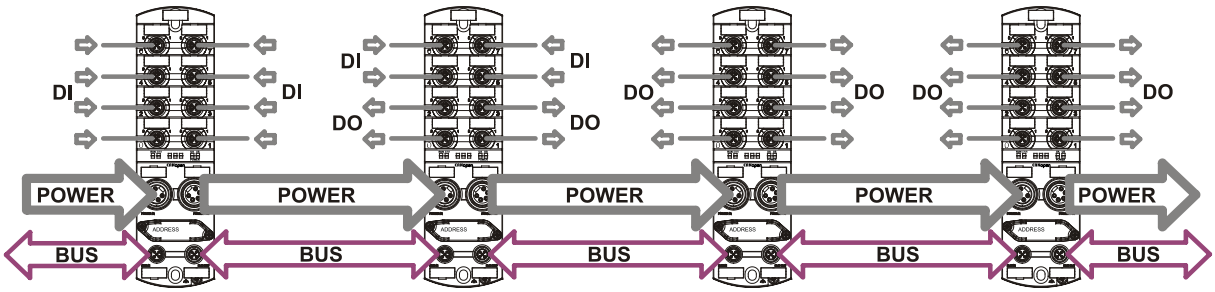


Fig. 1: System design principle

2. Installation

2.1 Mounting

2.1.1 Dimensioning

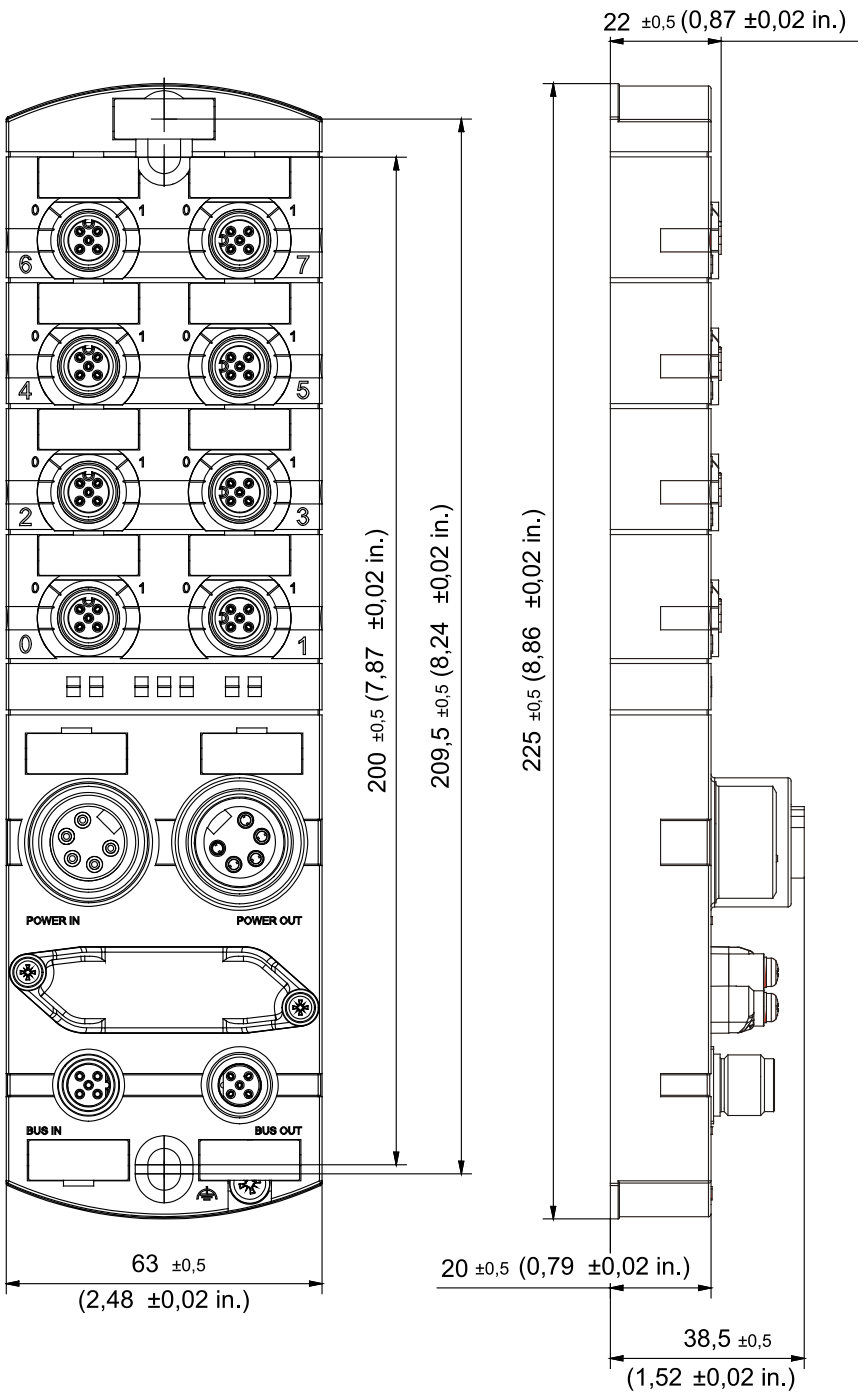


Fig. 2: Dimensioning

2.1.2 Spacing

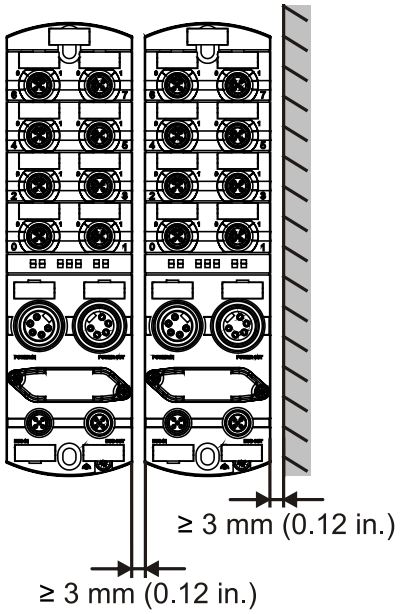


Fig. 3: Spacing

Angled connectors from Murrelektronik require a minimum spacing of 50 mm.

2.1.3 Mounting IMPACT67 Modules

The modules of the IMPACT67 Series can be fitted directly to an installation panel or a machine. The module features two mounting holes for this purpose.

Make sure that the mounting surface is flat and level to prevent mechanical stress in the module housing.

Attach the module using two 6 mm diameter screws and two washers as per DIN 433 T1/T2. The tightening torque is 3 Nm.

Function Ground

The FE connection is located at the bottom facing edge of the module housing. To ensure proper functioning in compliance with the EMC regulations specified in the datasheet, we recommend the use of our grounding strap. It is **not** included in the as-delivered state of the module. You must therefore purchase it separately.

Please refer to the chapter on Accessories.

Connect the PE terminal on the housing at low impedance to the function ground (refer to EMC information).

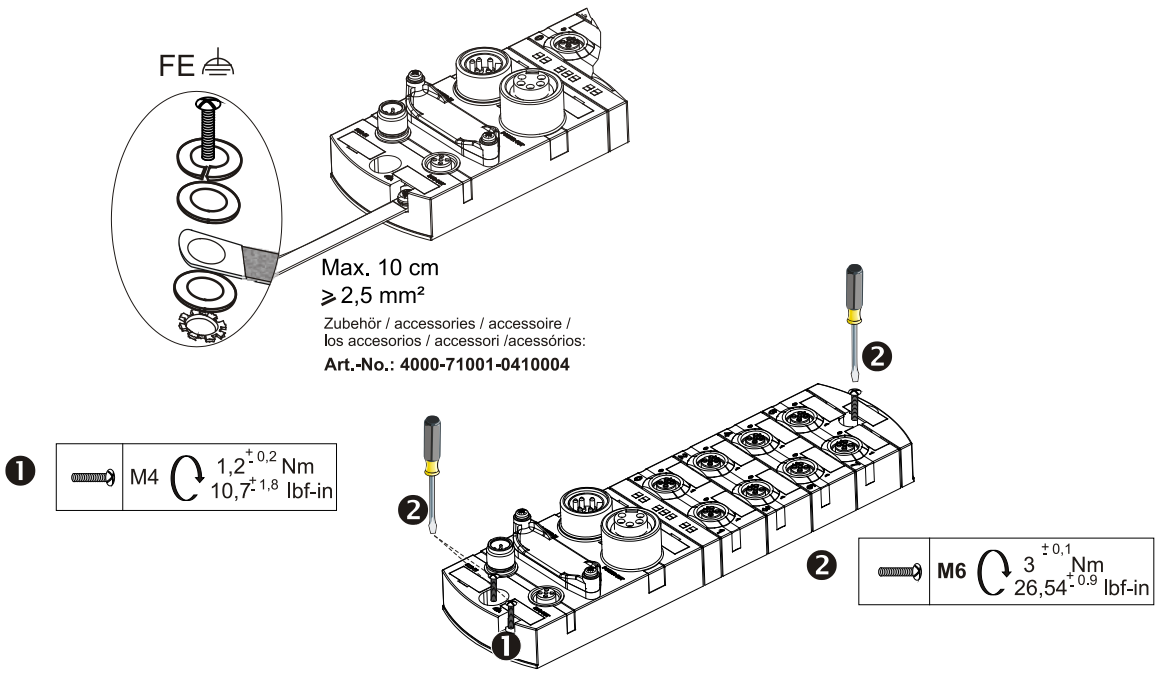
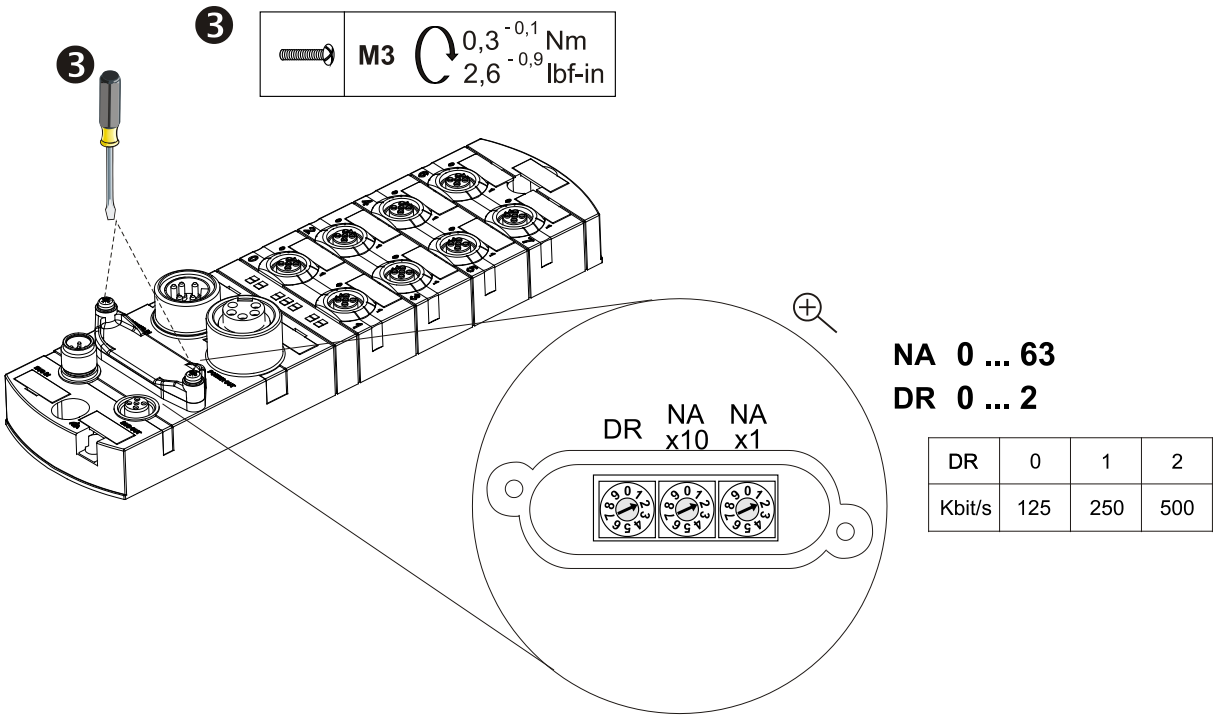


Fig. 4: Mounting

2.1.4 Addressing



DR	0	1	2
Kbit/s	125	250	500

Fig. 5: Data rate and Node ID Switches

- NA x10 = Node ID switch ×10
- NA x1 = Node ID switch ×1
- DR = Data rate switch

Further information on addressing is contained in the chapter on Startup.

2.1.5 IP67

IP67 protection is only guaranteed when all sockets are wired up or provided with blank plugs.

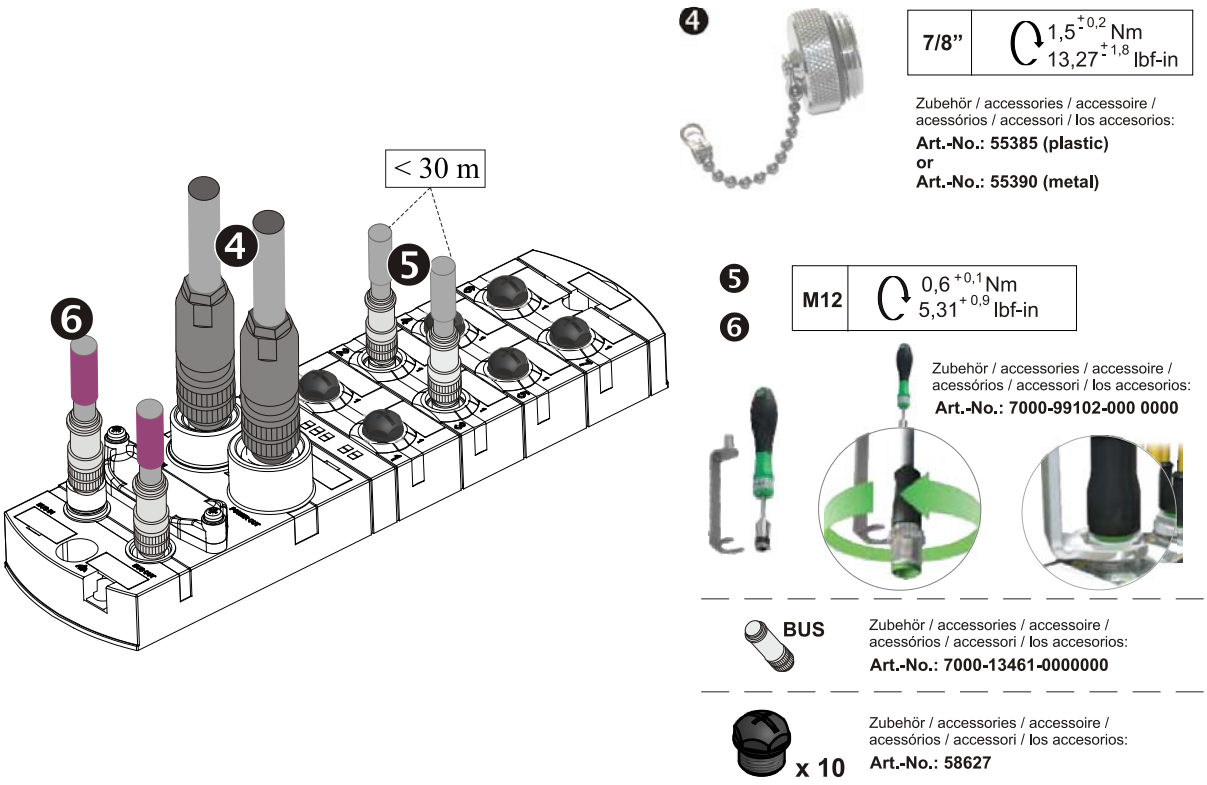


Fig. 6: Example of assembly for IP67

2.2 Connection Diagram of IMPACT67 DN

A

IMPACT67 DN DI16

M12

Pin 1	+24V Us / 0,2A
Pin 2	DI 10-17
Pin 3	0V
Pin 4	DI 00-07
Pin 5	⏚

A

IMPACT67 DN DI8 DO8

M12

M12 0, 1, 2, 3		M12 4, 5, 6, 7	
Pin 1	n.c.	Pin 1	24V Us / 0,2A
Pin 2	DO 04-07	Pin 2	DI 04-07
Pin 3	0V	Pin 3	0V
Pin 4	DO 00-03	Pin 4	DI 00-03
Pin 5	⏚	Pin 5	⏚

DO: 8x 2A

A

IMPACT67 DN DO8

M12

M12 0, 2, 4, 6		M12 1, 3, 5, 7	
Pin 1	n.c.	Pin 1	n.c
Pin 2		Pin 2	n.c
Pin 3	0V	Pin 3	0V
Pin 4	DO 00,02, DO 04,06	Pin 4	DO 01,03, DO 05,07
Pin 5	⏚	Pin 5	⏚

DO: 8x 2A

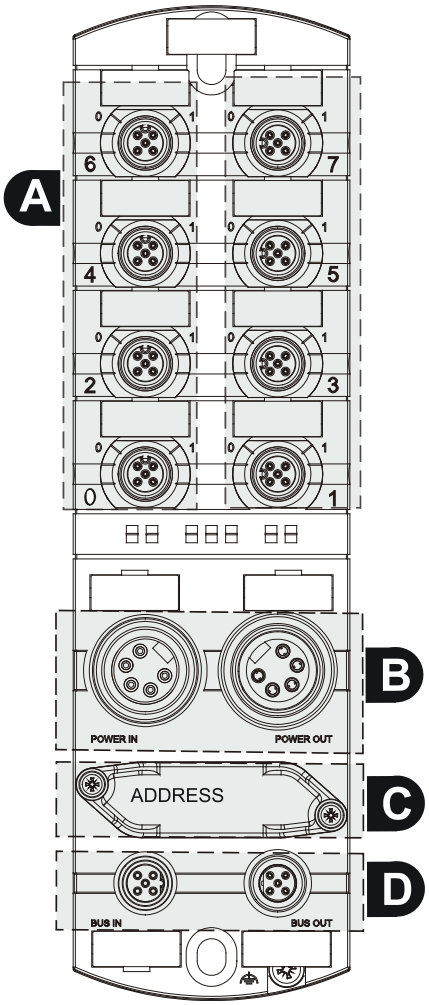
A

IMPACT67 DN DO16

M12

Pin 1	n.c.
Pin 2	DO 10-17
Pin 3	0V
Pin 4	DO 00-07
Pin 5	⏚

DO: 16x 0,5A



B

POWER IN **POWER OUT**

Pin 1	0V
Pin 2	0V
Pin 3	⏚
Pin 4	+24V U_S / max. 9 A
Pin 5	+24V U_A / max. 9 A

C

Adressierung / Adressage / Addressing / Direccionamiento / Indirizzamento / Endereçamento :

DR NA x10 NA x1

NA 0 ... 63

DR 0 ... 2

DR	0	1	2
Kbit/s	125	250	500

D

BUS IN **BUS OUT**

⏚	**Pin 1**	⏚
+V	**Pin 2**	+V
-V	**Pin 3**	-V
CAN_HIGH	**Pin 4**	CAN_HIGH
CAN_LOW	**Pin 5**	CAN_LOW
⏚	Gewinde Thread Filet Rosca Filetto Rosca	⏚

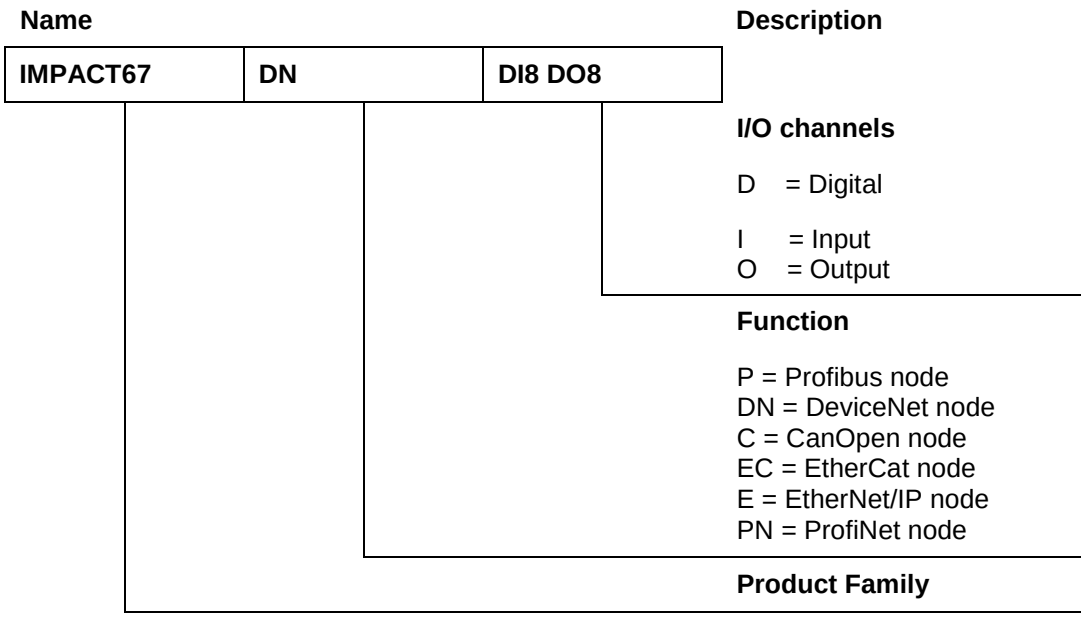
3. Configuration Notes

3.1 System Components

3.1.1 Product Designation Code

The designation format of IMPACT67 system components explains their function.

Examples:



Tab. 1: Example of product designation

3.1.2 IMPACT67 Modules

The purpose of the IMPACT67 system is the decentralized routing of signals at the I/O level and the supply of this information over a Fieldbus network (e.g. Profibus, CAN-open, DeviceNet, EtherCAT, EtherNet/IP).

The module and I/O units are powered by a 5-pin power plug 7/8" (mini style).

Article Number	Description	
55071	IMPACT67 DN DI16	
55072	IMPACT67 DN DI8 DO8 (2A)	
55073	IMPACT67 DN DO8 (2A)	
55074	IMPACT67 DN DO16 (0,5A)	

Tab. 2: IMPACT67 DN Modules

3.1.3 Accessories

3.1.3.1 Cables

DeviceNet		
Article Number	**Description**	
	Straight connector / straight connector	Cable length
7000-40531-8030150		1.5 m
7000-40531-8030300		3.0 m
7000-40531-8030500		5.0 m
7000-40531-8030750		7.5 m
7000-40531-8031000		10.0 m

Tab. 3: DeviceNet

DeviceNet		
Article Number	**Description**	
	Straight connector / with nonterminated wire end	Cable length
7000-13105-8030150		1.5 m
7000-13105-8030300		3.0 m
7000-13105-8030500		5.0 m
7000-13105-8030750		7.5 m
7000-13105-8031000		10.0 m

Tab. 4: DeviceNet

Power cable 7/8“		
Article Number	**Description**	
	Straight socket / with nonterminated wire end	Cable length
7000-78021-9610150		1.5 m
7000-78021-9610300		3 m
7000-78021-9610500		5 m
7000-78021-9610750		7,5
7000-78021-9611000		10 m

Tab. 5: Power cable 7/8“

Power cable 7/8“		
Article Number	**Description**	
	Straight connector / straight socket	Cable length
7000-50021-9610030		0.3 m
7000-50021-9610060		0.6 m
7000-50021-9610100		1 m
7000-50021-9610150		1.5 m
7000-50021-9610200		2 m

Tab. 6: Power cable 7/8“

Most cables and connectors are available in angled style.

3.1.3.2 Connectors for Self-Connection

Article Number	Description
7000-12761-0000000	DeviceNet bus M12 connector, A-coded, straight
7000-12961-0000000	DeviceNet bus M12, socket A-coded, straight
7000-00000-8039999	Bus cable for DeviceNet, 100 m collar
7000-78081-0000000	Power 7/8“ straight connector 5-pin, self-connecting
7000-78201-0000000	Power 7/8" socket straight 5-pin, self-connecting

Tab. 7: Connectors for self-connection

3.1.3.3 Valve Connector Style A

- Contact spacing 18 mm
- Operating voltage 24 V AC/DC, pressure switch 24 V DC
- Operating current max. 4 A

Article Number	Description	
7000-41341-0000000	M12 top connection	LED yellow, protection circuit for valves
7000-41361-0000000		LED yellow/green for pressure switch
7000-41461-0000000	M12 rear connection	LED yellow, protection circuit for valves
7000-41481-0000000		LED yellow/green for pressure switch

Tab. 8: Valve connector Style A

3.1.3.4 Valve Connector Combination Style A

- Contact spacing 18 mm
- Operating voltage 24 V AC/DC
- Operating current max. 4 A

Article Number	Description	
	M12 top connection	Cable length
7000-41501-2260000		100 mm
7000-41521-2260000		150 mm
7000-41541-2260000		200 mm
	M12 rear connection	Cable length
7000-41561-2260000		100 mm
7000-41581-2260000		150 mm
7000-41601-2260000		200 mm
Other system accessories on request		

Tab. 9: Valve connector combination Style A

3.1.3.5 Power T fitting 7/8" 5-pin

Article Number	Description	
7000-50061-0000000	Power T fitting 7/8“ 5-pin	

Tab. 10: Power T fitting 7/8“ 5-pin

3.1.3.6 Terminating Resistor

Article Number	Description	
7000-13461-0000000	Terminating resistor connector DeviceNet	

Tab. 11: Terminating resistor

3.1.3.7 Blank Plug

Article Number	Description
7000-41241-0000000	M12 diagnostic adapter (for line monitoring to bridges)
58 627	M12 plastic plug (SP 10 pieces)
338155	Diagnosis blanking plug M12x1 (VP 1 pc.)
55390	7/8" screw plug, metal with chain (SP 1 piece)
55385	7/8" screw plug, plastic (SP 1 piece)

Tab. 12: Blank plug

3.1.3.8 Identification Labels

Article Number	Description
996067	IDENTIFICATION LABELS 20X8MM (SP 10 pieces)

Tab. 13: Identification labels

3.1.3.9 Grounding Strap

Article Number	Description
4000-71001-0410004	Grounding strap 4 mm² 100 mm for M4 (SP 1 piece)

Tab. 14: Grounding strap

3.1.3.10 Torque Wrench

Article Number	Description
7000-99102-0000000	Set of M12 torque wrenches (SP 1 piece)

Tab. 15: Torque wrench

3.1.3.11 MICO

- – Fire protection (EN 60950-1)
- – Operating voltage protection (EN 61131-2)
- – Operating state memory device (EN 61131-1)

Article Number	Description	Nominal operating branch-circuit current (full load)	
9000-41034-0100400	MICO 4.4 (4 channels)	each 4 A	
9000-41034-0100600	MICO 4.6 (4 channels)	each 6 A	
9000-41034-0401000	MICO 4.10 (4 channels)	each 10 A	

9000-41042-0100400	MICO 2.4 (2 channels)	each 4 A	
9000-41042-0100600	MICO 2.6 (2 channels)	each 6 A	
9000-41042-0401000	MICO 2.10 (2 channels)	each 10 A	

Tab. 16: Overview of MICO variants

Information on products and accessories are available in our catalog and our online shop at:

onlineshop.murrelektronik.com

3.2 DeviceNet System Description

DeviceNet is a sensor/actuator bus system that originated in the U.S.A. and is meanwhile in widespread use in Asia and Europe. More than 350 manufacturers, among them a number of leading automation technology providers, offer a large portfolio of sensors/actuators through to intelligent controllers for connection to this modern device network.

The DeviceNet network is an open, reliable, and cost-effective network that permits the direct connection between the control system (PLC) and simple industrial devices, such as sensors and power switches (actuators), or even more complex devices, such as barcode readers and frequency converters.

DeviceNet is based on international standards (EN50325 and IEC62026) and the widely used CAN (Controller Area Network) technology (OSI Layers 1 and 2) and uses standard protocol circuits that have applications in various industries, e.g. the automotive industry.

DeviceNet features immunity to high temperatures and interference fields due to its robust protocol and circuits. Another of the distinguishing features of DeviceNet is its highly robust network performance (hamming distance = 6).

These features make the DeviceNet (CAN) ideal to withstand the tough environments that prevail in industrial automation technology.

Plug & Play connectivity and power supply over the network cable (poss. auxiliary power cable) reduce the commissioning and maintenance effort.

The DeviceNet application layer uses the producer-consumer process and permits a highly efficient data transfer. Compared with the traditional source-destination model, this is achieved by multicast and broadcast transmissions, polling, strobe, and time- and event-controlled transmissions (change of state).

Explanation (example) of DeviceNet communication modes for input and output data:

- Polling: The Master module ("scanner") sends output data cyclically to the assigned users and receives input data in the response telegram.

- Change-Of-State (COS): Telegrams are sent as soon as their content changes. In this case, only changes to the process map are transmitted in each case, not the process map itself.

- Cyclic: The modules send the data automatically when the cycle time expires.

- Strobed: The scanner requests the data in a broadcast telegram sent to all users.

Up to 8 bytes of useful data per message and fragmentation services for large messages are the best conditions for optimized data acquisition and the diagnosis of simple through to intelligent field devices.

Three transmission rates are available for various bus lengths: 125, 250, and 500 Kbps.

By using the bus bandwidth, DeviceNet achieves short system response times, despite a comparably high bus load, in particular in "change-of-state" mode.

The diagnosis functions of Murrelektronik DeviceNet devices include rapid fault localization. Diagnostic messages are sent over the bus and summarized by the Master. The status of the network connection, the device status of the module and inputs/outputs, and the power supply are displayed by LEDs (standardized).

DeviceNet is a simple, cost-efficient wiring system based on a 4-wire cable. One wire pair to transmit data and one wire pair to transmit auxiliary power to sensors over a distance of up to 500 m. System expansions > 500 m are possible, but require the use of repeaters.

Installation is greatly simplified through the use of preterminated cables. Wiring errors are avoided and setup is more rapidly successful. Products on the market cover field bus cables, power supply cables, sensor cables, and accessories, such as terminating resistors and T-fittings. Field-assembled connectors and cables are also available.

DeviceNet specifications are available to anybody from the independent and open user organization "Open DeviceNet Vendor Association" (ODVA). The source codes for Master and Slave devices are supplied by various providers.

All manufacturers with certified DeviceNet products on the market are normally members of the ODVA.

shows the DeviceNet Conformance Tested Logo and DeviceNet Logo general. Certified devices bear the DeviceNet Conformance Tested Logo. An overview of certified DeviceNet products is also available on the web at the ODVA website.

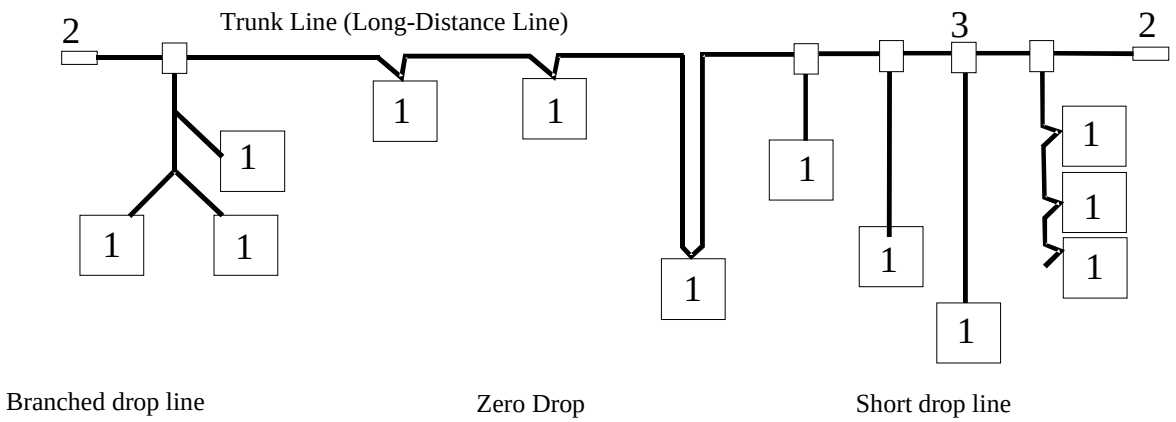
As a result of our active membership in the ODVA, Murrelektronik has extensive DeviceNet expertise for the development of components for this bus system.

You will find us and ODVA at:

www.murrelektronik.com, www.odva.org

Fig. 7: DeviceNet Conformance Tested Logo and DeviceNet Logo general

The figure below shows an example of the topology of a DeviceNet network. Characteristic of DeviceNet is the bus cable that comprises a power supply for DeviceNet users.



1 - Network node

2 - Terminating resistor

3 - Tap[1]

Fig. 8: DN system topology

[1] Tap – T fitting

3.3 System Data

The table below illustrates the most important system data.

Topology	**Tree Topology**
Transmission network	Twisted shielded four-wire cable, separate conductors for data (white and blue) and power (black and red)
Line lengths	Main line max. 500 m, spur lines max. 6 m
Number of bus devices	Max. 64
Number of I/O points	Control-dependent
Addresses	One specific MAC ID per device in the range from 0 to 63
Addressing	MAC ID, Serial Number (32 bits)
Transmission rates	Dependent on the cable length (max. 500 Kbps): 500 Kbps up to 100 m (thick cable) 250 Kbps up to 250 m (thick cable) 125 Kbps up to 500 m (thick cable) Maximum length of main line with repeaters 3 km
User data	8 bytes per telegram
Terminating resistors	121 Ω, always at each end of the data cable
Error recognition	Identification of faulty messages, automatic repetition
Power supply	24 VDC tolerance (total) +/- 4%

Tab. 17: DN system data

3.4 DeviceNet Bus Line

Murrelektronik offers a number of preterminated and matching round cables. Please refer to Chapter 3.1 System Components.

Matched to the requirements of various applications, the fieldbus-side system cables can be implemented using round cables, or the gray profile ribbon cable typical of DeviceNet.

One electrical aspect is decisive when choosing suitable transmission lines:

The DC resistance (wire cross-section) because of auxiliary power transmission.

The cable make-up is 4-wire in all cases. Cable shielding is required because of the transmission technology.

Actuators require an additional auxiliary power supply.

The figures below illustrate the cable make-up.

CAUTION:

The maximum permitted current is dependent on the system cable used and is max. 8 A! (ODVA DeviceNet “Planning and Installation“ Manual)

Cable

lilac DeviceNet bus cable

gray - 24 VDC auxiliary power

Conductors (DeviceNet bus cable)

white	**-system cable fieldbus (CAN_H)**
blue	**-system cable fieldbus (CAN_L)**
red	**-24 VDC auxiliary power (+24 VDC)**
black	**-24 VDC auxiliary power (0V)**

Conductors (power cable)

Black conductors 1	**0 V**
Black conductors 2	**0 V**
green/yellow	**FE**
Black conductors 3	**sensor and bus supply**
Black conductors 4	**actuator power supply**

Make-up of DN round cable

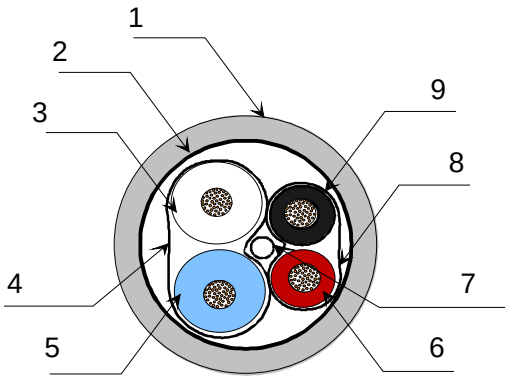


Fig. 9: DN round cable

1	Jacket	6	Power conductor, red (+24 V)
2	Cable shield	7	Shield conductor
3	Bus conductor, white (CAN_H)	8	Power line pair shield
4	Bus line pair shield	9	Power conductor, black (0V)
5	Bus conductor, blue (CAN_L)		

Make-up of DN profile line

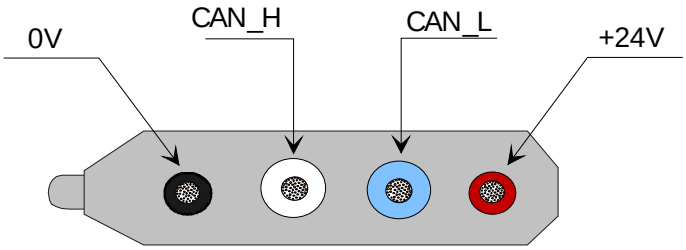


Fig. 10: DN profile line

DeviceNet products with direct connection for the profile line have a geometric code dependent on their type. This results in a reliable protection against incorrect electrical polarity.

With the various line types (thin, thick, flat), there is a relationship between the transmission rate (used) and the length of the main line. See the table below:

Relationship between transmission rate and main line length

Data Rate	Length of main line (thick cable)	Length of main line (thin cable)	Length of main line (flat cable)	Cumulative total length of drop lines
500 Kbps	100 meters	100 meters	75 meters	39 meters
250 Kbps	250 meters	100 meters	200 meters	78 meters
125 Kbps	500 meters	100 meters	420 meters	156 meters

Tab. 18: Relationship between transmission rate and main line length

The max. length of a drop line may not exceed 6 m.

Make sure that the DeviceNet bus cable at the ends between CAN_H and CAN_L is correctly terminated (120 Ω).

Information on terminating resistors is in Chapter 3.1 System Components.

Calculating cable length:

If the distance from a branch in the main cable to its furthest removed module is greater than the distance to the next terminator, this drop line length (Drop A-C) is calculated in the total cable length.

Example:

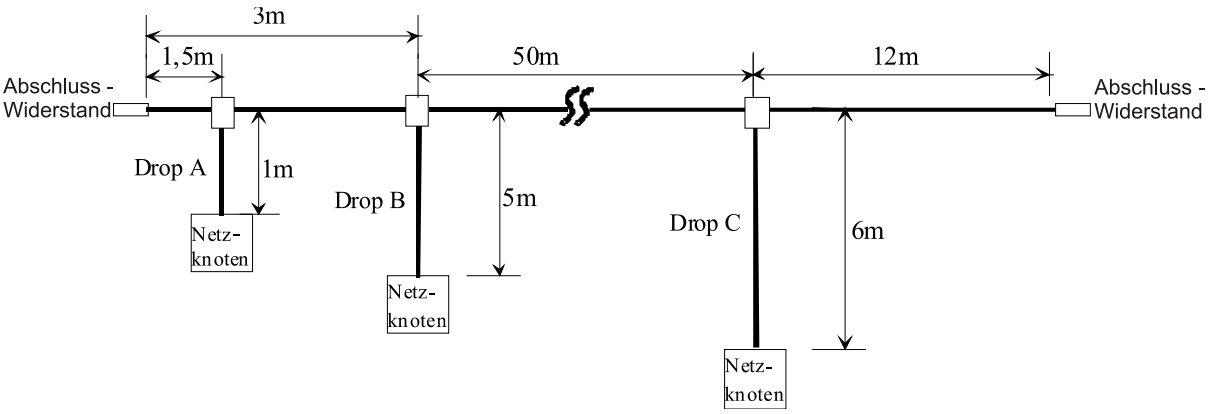


Fig. 11: Example network for cable length calculation

Drop A:	does not appear in the max. cable length	1.5 m > 1 m
Drop B:	is calculated into the max. cable length	3 m < 5 m
Drop C:	does not appear in the max. cable length	12 m > 6 m

Maximum cable length: 5 m + 50 m + 12 m = 67 m

The cumulative drop line length results from the sum of all drop lines in the cable system. This sum may not exceed the maximum cumulative length referred to the transmission rate (see Table "Relationship between transmission rate and main line length").

For example, if the cumulative drop line length is 45 m, a maximum data rate of 250 Kbps may be used if a thick cable is installed.

3.5 Power Supplies

We recommend the use of primary switched-mode power supplies in applications with the IMPACT67 and to supply the sensors and actuators.

The power at Pin 4 of the power supply connector must never be switched OFF during operation; otherwise, the IMPACT67 module can no longer participate in bus communication.

IMPACT67 modules require a DC power supply in the range 18 to 30 V.

System-related limit values regarding system power supply must be strictly observed if maximum functional safety and fault-free operation are to be ensured.

Always ensure that the system power, measured at the device furthest from the power supply, does not drop below 18 VDC.

A load current-related voltage drop in the power supply cable occurs due to the central power supply of IMPACT67 modules, including all their connected sensors.

In critical cases, voltage drop optimization is obtainable by changing the location of the power supply unit within the overall system and by using power supply cables with a larger conductor cross-section.

Calculating the required conductor cross-sections is dependent on installation-specific configuration data and is therefore not discussed in this manual.

The power supply module may be damaged if power supply is polarity-reversed. For this reason, we recommend the use of our preterminated 7/8" cables.

3.5.1.1 Connecting the Power Supply to the Module

The auxiliary power is required to power the actuators and sensors. The electronics of the IMPACT67 are powered from the sensor power supply.

The sensor power supply may not be switchable. It powers the module electronics.

The 7/8“ connector is designed to carry a maximum current of 9 A per pin. This is taken into account when connecting the power supply to another circuit.

Power Supply Line

Module supply cables must have VDE approval and a maximum core cross-section of 1.5 mm². All further power supply line characteristics depend on individual applications and are not covered in this manual.

The maximum permitted core cross-section is 1.5 mm².

Connecting to IMPACT67

1. Mounting the IMPACT67 module.
2. Attach FE cable to IMPACT67 module.
3. Hook up bus connection.
4. Connect power supply.

On IMPACT67 modules, the power supply at Pin 4 of the power supply connector may not be routed through EMERGENCY STOP circuits since this voltage powers the entire I/O section and the sensors.

3.5.1.2 System Power Supply

DeviceNet modules require a DC voltage power supply of typically 24 VDC (Class 2) that must comply with the regulations of DeviceNet industrial power supplies.

Power supply unit performance is dependent on the number and power requirements of the connected users.

It is recommended to take different power supplies to power the sensors and actuators in order to achieve greater immunity from interference and decoupling.

We recommend the use of primary switched-mode power supplies for application with the DeviceNet bus and for supplying the sensors and actuators.

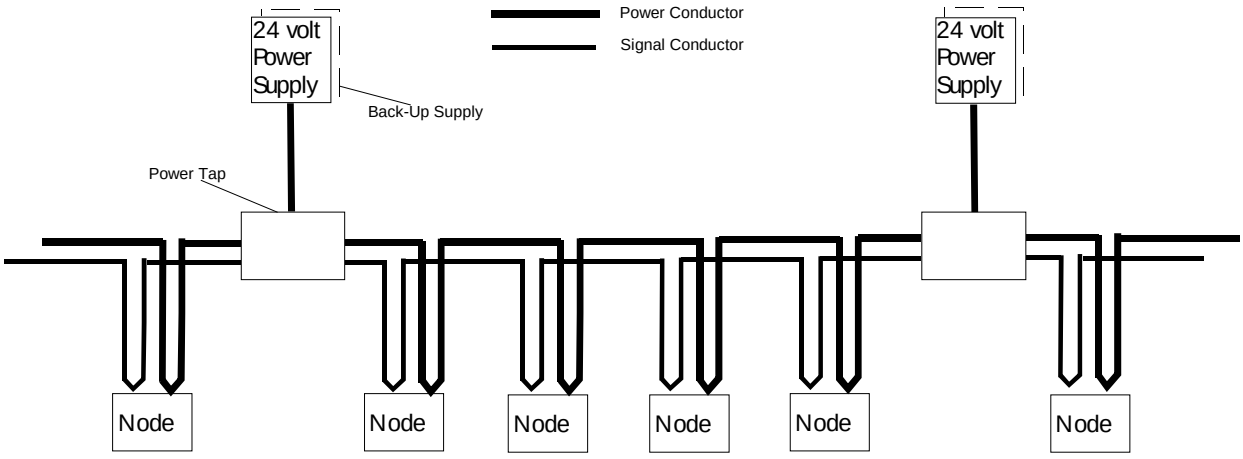


Fig. 12: DeviceNet power supplies

DeviceNet systems require a power supply DC voltage (power supply unit) ranging from 23.76 V to 24.24 VDC (24 V +/- 1%) that must comply with the IEC regulations for "Protective Extra-Low Voltage" (PELV).

DeviceNet Power Tap shows the circuit diagram of a power tap.

A power supply unit can be placed at any point in the network.

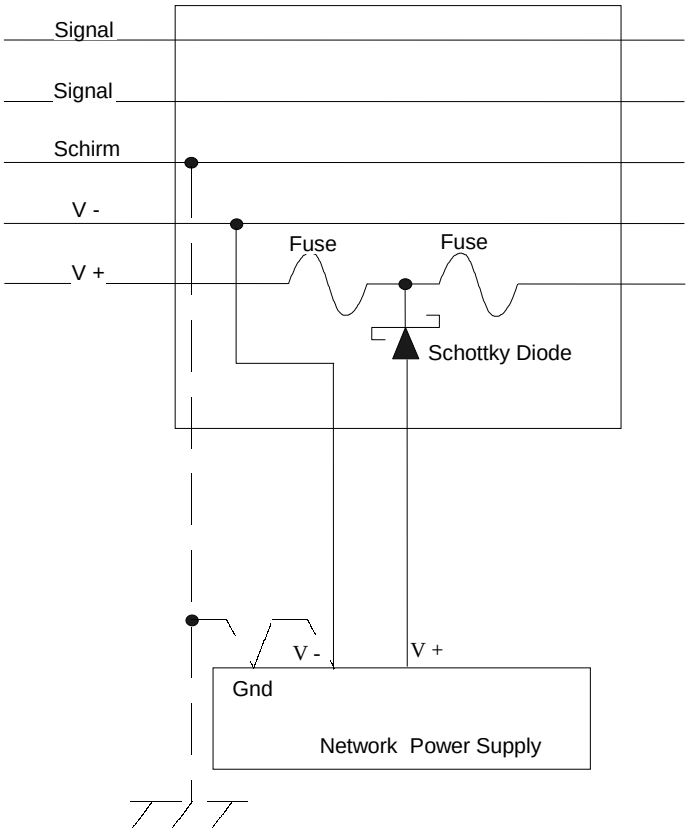


Fig. 13: DeviceNet Power Tap

System-related limit values regarding system power supply must be strictly observed if maximum functional safety and fault-free operation are to be maintained.

Always make sure that the system power, measured at the device furthest from thepower supply, does not drop below 23.04 V (24 V - 4%).

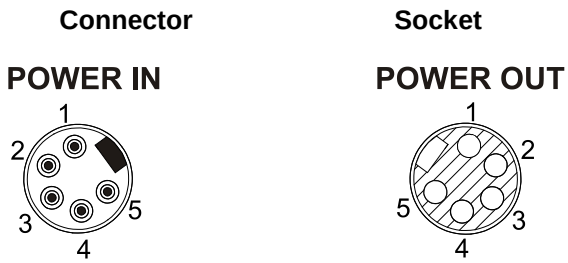
A load current-related voltage drop across the power supply cable occurs due to the central power supply of the DeviceNet users, including all their connected sensors, from the DeviceNet system power supply unit.

In critical cases, an optimization is achievable, for example due to a change of location of the system power supply within the whole system and the use of power supply lines with a larger cable cross-section (thick cable, thin cable, flat cable).

The electronics of the IMPACT67 are powered from the DeviceNet bus. Additional auxiliary power is required to power the sensors and actuators. At least two voltages (bus voltage and sensor power supply) are required for regular system operation. The sensor power supply is fed via the 7/8“ socket. The module can communicate with the bus as soon as it is powered over the DeviceNet bus.

The actuator power supply (Pin 5) may be designed as a switched-mode device for EMERGENCY OFF circuits (DO modules only).

Pin assignment of 5-pin power plug 7/8" (mini style)



0V	**Pin 1**	0V
0V	**Pin 2**	0V
⏚	**Pin 3**	⏚
+24V U_S / max. 9 A	**Pin 4**	+24V U_S / max. 9 A
+24V U_A / max. 9 A	**Pin 5**	+24V U_A / max. 9 A

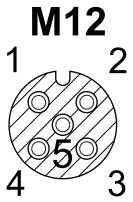
Tab. 19: Pin assignment of power plug

3.6 Connecting Sensors and Actuators

3.6.1 Connecting Sensors

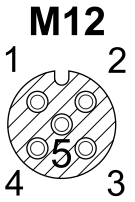
The table below depicts all the general pin assignments for the M12 socket slots

Pin 1	+ 24 V	Sensor supply
Pin 2	Function channel	Channel
Pin 3	0 V	Reference potential
Pin 4	Function channel	Channel
Pin 5	⏚	Function ground



Tab. 20: General pin assignment of M12 slots

3.6.1.1 IMPACT67 DN DI16



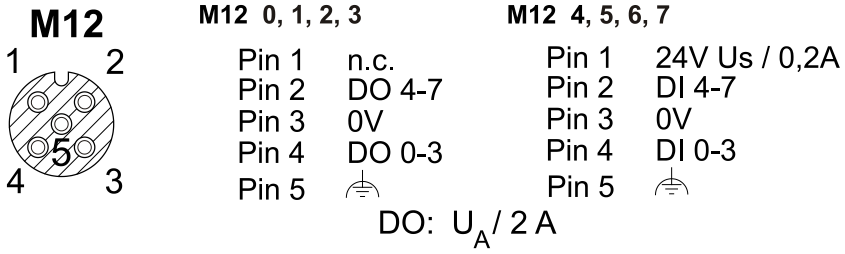
Pin 1 +24V Us / 0,2A
Pin 2 DI 10-17
Pin 3 0V
Pin 4 DI 0-7
Pin 5 ⏚

The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DI 00	DI 10
1	DI 01	DI 11
2	DI 02	DI 12
3	DI 03	DI 13
4	DI 04	DI 14
5	DI 05	DI 15
6	DI 06	DI 16
7	DI 07	DI 17

Tab. 21: M12 slots to I/O labels

3.6.1.2 IMPACT67 DN DI8 DO8



The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DO 00	DO 04
1	DO 01	DO 05
2	DO 02	DO 06
3	DO 03	DO 07
4	DI 00	DI 04
5	DI 01	DI 05
6	DI 02	DI 06
7	DI 03	DI 07

Tab. 22: M12 slots to I/O labels

3.6.1.3 Sensor Power Supply

Sensors can be powered directly via pins 1 (+24 V) and 3 (0 V) of the M12 slots. The sensor power supply is protected per M12 slot. This protection is always self-resetting. The maximum current for the sensor power supply is 200 mA per M12 slot. Note the derating in the drawing below:

Derating Sensor Power Supply

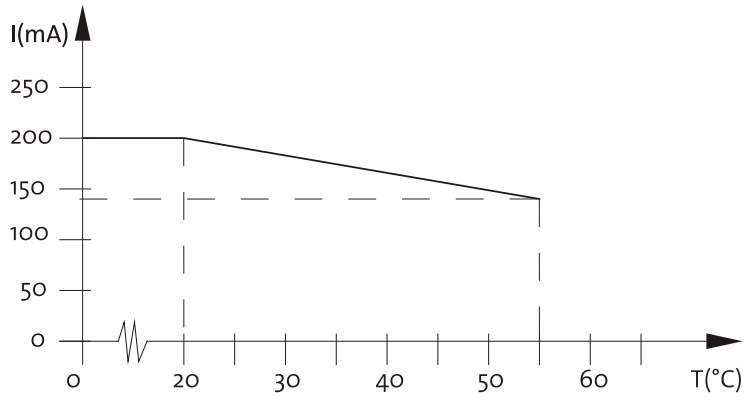


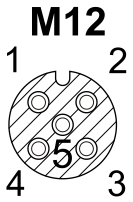
Fig. 14: Derating sensor power supply

IMPACT67 modules may be loaded to max. 200 mA per M12 slot (sensor current).

3.6.2 Connecting Actuators

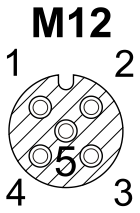
The table below depicts all the general pin assignments for the M12 socket slots

Pin 1	n.c.	not connected
Pin 2	Function channel	Channel
Pin 3	0 V	Reference potential
Pin 4	Function channel	Channel
Pin 5	⏚	Function ground



Tab. 23: General pin assignment of M12 slots

3.6.2.1 IMPACT67 DN DO16



Pin 1 n.c.
Pin 2 DO 10-17
Pin 3 0V
Pin 4 DO 0-7
Pin 5 ⏚

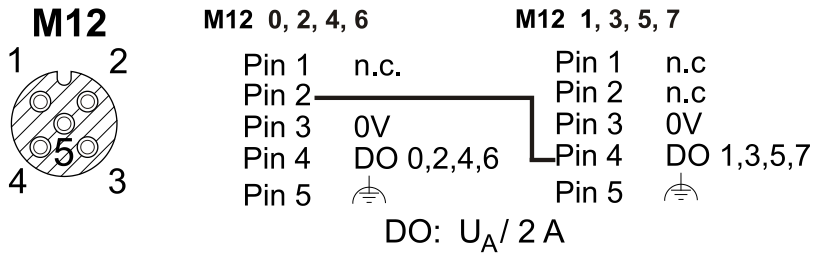
DO: U_A / 0,5 A

The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DO 00	DO 10
1	DO 01	DO 11
2	DO 02	DO 12
3	DO 03	DO 13
4	DO 04	DO 14
5	DO 05	DO 15
6	DO 06	DO 16
7	DO 07	DO 17

Tab. 24: M12 slots to I/O labels

3.6.2.2 IMPACT67 DN DO8



The table below depicts the assignment between M12 slots and I/O labels.

M12 slot	Channel (Pin 4)	Channel (Pin 2)
0	DO 00	DO 01
1	DO 01	-
2	DO 02	DO 03
3	DO 03	-
4	DO 04	DO 05
5	DO 05	-
6	DO 06	DO 07
7	DO 07	-

Tab. 25: M12 slots to I/O labels

3.6.2.3 Actuators

Each output of the DO8 and DI8/DO8 variants is loadable to max. 2 A.

Each output of the DO16 variant is loadable to max. 0.5 A.

The total current may not exceed 9 A due to the maximum current carrying capacity of the 7/8“ power connector.

If the actuator power supply is looped, make sure that the total current of all modules does not exceed 9 A.

The module may be damaged if the actuator power supply polarity is reversed.

The module may heat up depending on the load.

If an overload or a short-circuit occurs at an output, the output is shut down. To reset the output, it must first be reset using the control software.

If an M12 slot (I/O channel) is not used, it must be fitted with an M12 blank plug in compliance with IP 67 specifications.

In order to achieve rapid short-circuit cutoff times, we recommend not to exceed the following lengths:

max. 15 m feed line (POWER IN) 1.5 mm² and max. 1.5 m actuator line 0.75 mm²

max. 10 m feed line (POWER IN) 1.5 mm² and max. 3 m actuator line 0.75 mm²

3.7 Unused Connections

Unused sockets must be closed off with blank plugs. Otherwise, IP 67 protection is not guaranteed.

4. Startup

Here, the fieldbus and scanner must be started. The network is read in with the aid of a software tool (incl. hardware). Prior to this, the EDS files of the IMPACT67 modules must be incorporated in the software.

The DeviceNet users are recognized in the sequence in which they where addressed on the bus. If there are devices on the bus that are addressed by a software, the devices may only be connected to the bus sequentially since they all have the same preset MAC ID.

When the project engineering is completed for the overall system, and the bus communication is active, additional devices can be connected to the bus at any time. The precondition here is a correctly set MAC ID and baud rate.

Typical errors during setup include: Damage to the bus cable, incorrect baud rate, duplicate MAC IDs, CAN_H and CAN_L swapped on the bus connection, power (auxiliary power, in particular sensor power supply) no applied, bus not correctly terminated, and EDS files incorrectly or not at all integrated!

Prior to setup, a competent system structure check of the field bus must be assured.

Users that have an identical MAC ID do not complete the MAC ID test. After the self-test, the NS-LED lights up red.

Each device type possesses an EDS file (*.eds) and a graphic (*.bmp).

4.1 Terminating DeviceNet Bus Segments

A terminating resistor (120 ohms) must be fitted to the start and end of each segment.

4.1.1 EDS Files

The EDS file is created explicitly for the device type (I/O). The consequence is that, in the IMPACT67 product line, each device is assigned a separate EDS file with the extension "*.eds". The devices are assigned a uniform icon with the extension "*.ico".

The EDS file contains a lot of information concerning the module e.g.:

device type, manufacturer, vendor ID, article number, software version, hardware version, etc.

EDS files are module-specific. Only Murrelektronik technical personnel are allowed to perform application-specific modifications.

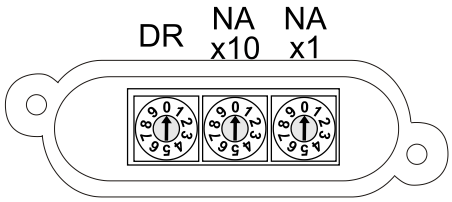
EDS files are assigned as shown in the table below:

Module type	Name of EDS file	Name of icon
IMPACT67 DN DI16	IMPACT67-DN DI16 55071.eds	IMPACT67.ico
IMPACT67 DN DI8 DO8	IMPACT67-DN DI8 DO8 55072.eds	IMPACT67.ico
IMPACT67 DN DO8	IMPACT67-DN DO8 55073.eds	IMPACT67.ico
IMPACT67 DN DO16	IMPACT67-DN DO16 55074.eds	IMPACT67.ico

Tab. 26: EDS files

The latest EDS files are retrievable over the web from: http://www.murrelektronik.com. Navigate to the download section under configuration files.

4.1.2 Addressing



NA 0 ... 63
DR 0 ... 2

DR	0	1	2
Kbit/s	125	250	500

Fig. 15: Data Rate and Node ID Switches

There are two switches for setting the Node ID: NA x10 (decades) and NA x1 (single digits). Addresses 0 to 63 are permitted. It is normal to assign Address 0 to a DeviceNet scanner. We therefore recommend you to set the address starting with Address 1 for IMPACT67 modules. If an address greater than 63 is set, the device operates with default address 63. The Node ID is only assumed when the power supply is applied to the IMPACT67. As a result, a power reset must always be made after the Node ID is changed.

Always make sure that the Node ID is unique for each device in the DeviceNet network.

Data Rate Settings

The data rate is set with a "DR" rotary switch. The following data rates can be set:

Switch Position	Data Rate
0	125 Kbps
1	250 Kbps
2	500 Kbps
3	125 Kbps
4	125 Kbps
5	125 Kbps
6	125 Kbps
7	125 Kbps
8	125 Kbps
9	125 Kbps

Tab. 27: Setting the data rate

4.2 Operating Modes

The following transmission services are selectable for I/O data exchange:

- **Polling**
- **Change-Of-State (COS)**
- **Cyclic.**

The I/O data are exchanged using the polling transmission service via the default parameters defined in our EDS files.

4.2.1 Polling

Poll Command: The I/O message is sent to a single specific device (point-to-point). The scanner must send a separate poll command to each "poll" slave. The command contains the output data of the slave, provided the device is fitted with outputs.

Poll Response: The "polled" slave sends its input data back, provided it supplies input data. The typical polling times of a PLC are approx. 10 ms.

4.2.2 Change-Of-State

Change-of-State: The devices transfer their I/O data when their states change.

Heartbeat: Heartbeat is used in this operating mode as a device monitor. The cyclical scan (e.g. every 250 ms) checks whether the slave is connected to the network.

This efficient (for discrete I/O applications) can minimize bus load.

4.2.3 Cyclic

Cyclical data transfer: The devices transfer their I/O data using a user-defined time base.

This operating mode is suitable for highly efficient analog I/O applications.

4.3 Mapping I/O Data

The scanner has received all the information about data width, operating mode, etc. via the device identification. Using this information, the scanner generates an adequate periphery map of all detected slaves in the DeviceNet system and maps the I/O data in the so-called scan list, depending on their physical arrangement.

The user can assign the scan list to the logic addresses in the PLC according to the periphery map of the bus users.

In a manufacturer-specific instance, the I/O data of IMPACT67 modules in Class 4 are stored in Attribute 3 in each case and are also retrievable using the Explicit Message service. The data format is identical for each of the 3 supported operating modes.

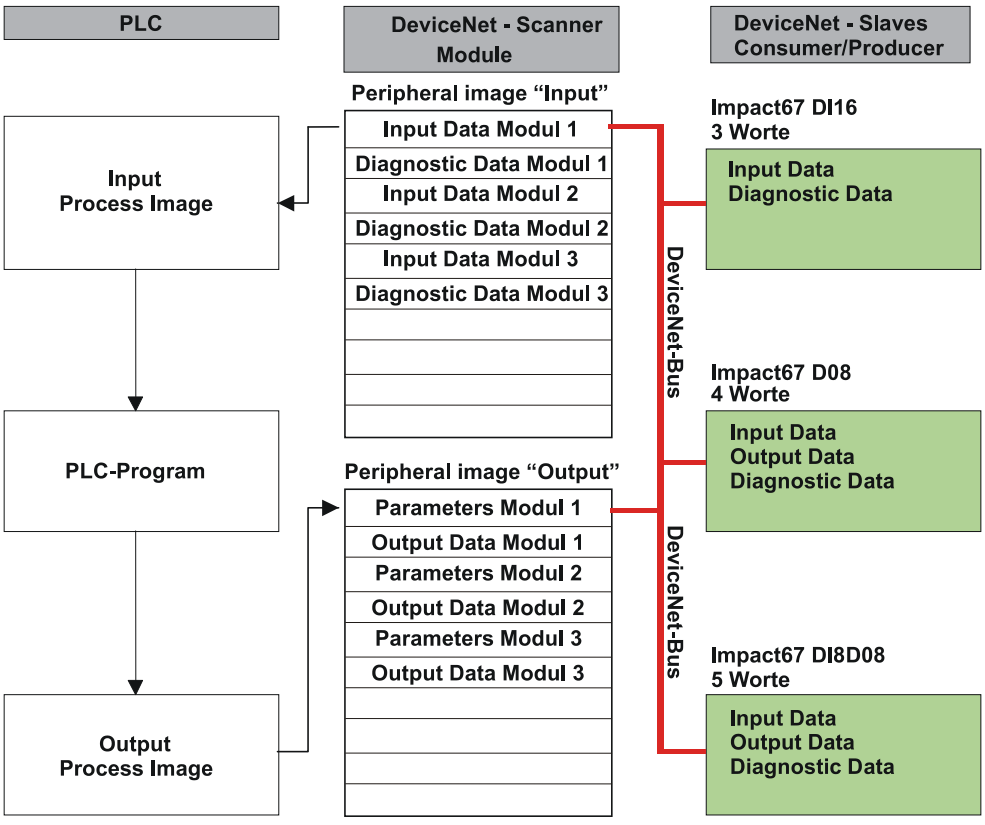


Fig. 16: Data exchange between PLC, interface modules, and DeviceNet bus users

4.3.1 I/O Data IMPACT67 DN DI16 55071

Manufacturer-specific format with 16-bit inputs, group diagnosis for the module. Assembly instance 100 is used.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input channel 07	Input channel 06	Input channel 05	Input channel 04	Input channel 03	Input channel 02	Input channel 01	Input channel 00
1	Input channel 17	Input channel 16	Input channel 15	Input channel 14	Input channel 13	Input channel 12	Input channel 11	Input channel 10
2	-	-	-	-	-	Sensor short-circuit diagnosis	Reserved	Sensor power supply undervoltage diag-nosis

4.3.2 I/O Data IMPACT67 DN DI8 DO8 55072

Manufacturer-specific format with 8-bit inputs and 8-bit outputs, group diagnosis for the module and actuator short-circuit diagnosis. Assembly instances 100 and 101 are used.

Assembly instance 100:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Input channel 07	Input channel 06	Input channel 05	Input channel 04	Input channel 03	Input channel 02	Input channel 01	Input channel 00
1					Actuator short-circuit diagnosis	Sensor short-circuit diagnosis	Actuator power supply undervoltage diag-nosis	Sensor power supply undervoltage diag-nosis
2	Actuator short-circuit channel 07	Actuator short-circuit channel 06	Actuator short-circuit channel 05	Actuator short-circuit channel 04	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00

Assembly instance 101:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 07	Output channel 06	Output channel 05	Output channel 04	Output channel 03	Output channel 02	Output channel 01	Output channel 00

4.3.3 I/O Data IMPACT67 DN DO8 55073

Manufacturer-specific format with 8-bit outputs, group diagnosis for the module and actuator short-circuit diagnosis. Assembly instances 100 and 101 are used.

Assembly instance 100:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0					Actuator short-circuit diagnosis	Reserved	Actuator power supply undervoltage diag-nosis	Sensor power supply undervoltage diag-nosis
1	Actuator short-circuit channel 07	Actuator short-circuit channel 06	Actuator short-circuit channel 05	Actuator short-circuit channel 04	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00

Assembly instance 101:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 07	Output channel 06	Output channel 05	Output channel 04	Output channel 03	Output channel 02	Output channel 01	Output channel 00

4.3.4 I/O Data IMPACT67 DN DO16 55074

Manufacturer-specific format with 16-bit outputs, group diagnosis for the module and actuator short-circuit diagnosis. Assembly instances 100 and 101 are used.

Assembly instance 100:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0					Actuator short-circuit diagnosis	Reserved	Actuator power supply undervoltage diag-nosis	Sensor power supply undervoltage diag-nosis
1	Actuator short-circuit channel 07	Actuator short-circuit channel 06	Actuator short-circuit channel 05	Actuator short-circuit channel 04	Actuator short-circuit channel 03	Actuator short-circuit channel 02	Actuator short-circuit channel 01	Actuator short-circuit channel 00
2	Actuator short-circuit channel 17	Actuator short-circuit channel 16	Actuator short-circuit channel 15	Actuator short-circuit channel 14	Actuator short-circuit channel 13	Actuator short-circuit channel 12	Actuator short-circuit channel 11	Actuator short-circuit channel 10

Assembly instance 101:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output channel 07	Output channel 06	Output channel 05	Output channel 04	Output channel 03	Output channel 02	Output channel 01	Output channel 00
1	Output channel 17	Output channel 16	Output channel 15	Output channel 14	Output channel 13	Output channel 12	Output channel 11	Output channel 10

5. Diagnosis

Diagnostic information is an important basis for easy setup and quick troubleshooting.

Clear information from the I/O module and its connected periphery components, such as sensors and actuators, identify, rectify, and therefore minimize downtimes.

5.1 LED Displays

All IMPACT67 modules have separate and clearly arranged displays for bus status, device status, and I/O status displays. These displays are located on the front of the device.

5.1.1 Bus and Device Status LEDs

The LEDs on the front of the module are clearly marked for identification. Display is provided by LEDs that light up permanently or flash. The figure below depicts LED layout and the table lists the functions.

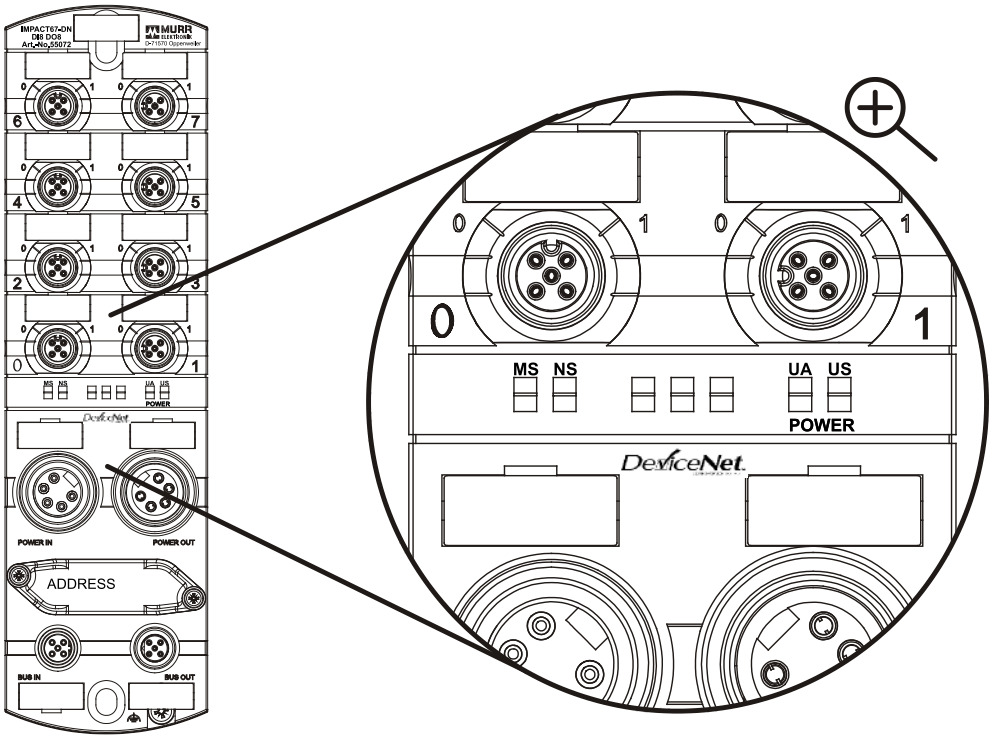


Fig. 17: Bus and device status LEDs on the module front panel

The device self-test is executed as soon as the IMPACT67 is powered over the bus. The self-test lasts about 2 s. After the end of the DupMac test (test whether other modules with an identical MAC ID are on the bus), the NS LED green flashes. The DupMac test can only be completed when at least one other user is on the bus. If the DupMac test is defective, a free address must be set on the module using the rotary switch.

Bus Status LEDs on Module Front Panel

LED designation	LED display	Response	Meaning
MS		off	Self-test not completed
MS		green	Self-test completed
NS		off	DupMac check not completed, no other bus user on the DeviceNet network
NS		flashing green	DupMac check completed, no link to master
NS		green	Link to master (explicit and/or I/O link)
NS		flashing red	List to master lost (timeout, bus link interrupted)
NS		red	Bus link interrupted, physical general bus error (power reset required)

Tab. 28: Bus status LEDs on module front panel

Device status LEDs on the module front panel

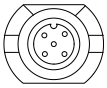
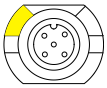
LED Description	LED Display	Response	Status	Meaning
US POWER (red/green)		off	No voltage	Failure of module and sensor power supply
		green	Voltage applied	Module and sensor power supply applied
		red	Undervoltage	Module and sensor power supply undervoltage
UA POWER (red/green)		off	No voltage	Failure of actuator power supply
		green	Voltage applied	Actuator supply OK
		red	Undervoltage	Undervoltage, actuator power supply

Tab. 29: Device status LEDs on the module front panel

5.1.2 I/O Status LEDs at M12 Slots

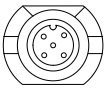
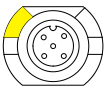
Each input and output is assigned a separate status display They are labeled with '00 to 07' and '10 to 17'. The displays are located directly next to the corresponding M12 socket. This makes it easy to identify the status of peripheral components, such as sensors and actuators.

LED Display of Digital Inputs

Input with NO contact function	Voltage at Input	Logic value	LED display	
	0 V	0		off
	24 V	1		yellow

Tab. 30: LED display of digital inputs

LED Display of Digital Outputs

output	Logic value	Voltage at output	LED display	
	0	0 V		off
	1	24 V		yellow

Tab. 31: LED display of digital outputs

5.1.3 LED Display for Diagnosis

5.1.3.1 IMPACT67 DI16 Modules

Error	LED at M12 Socket		LED Designation
	Socket No. x		U_S
	Channel 0x	Channel 1x	
Module power supply undervoltage			red
Short-circuit (sensor supply)	both red		

Tab. 32: LED display for diagnostics

5.1.3.2 IMPACT67 DI8 DO8 modules

Error	LED at M12 Socket		LED Designation	
	Socket No. x		U_A	U_S
	Channel 0x	Channel 1x		
Module power supply undervoltage				red
I/O power supply undervoltage			red	
No actuator supply			off	
Actuator short-circuit	red	red		
Short-circuit (sensor supply)	both red			

Tab. 33: LED display for diagnosis

5.1.3.3 IMPACT67 DO8 Modules

Error	LED at M12 Socket		LED Designation	
	Socket No. x		U_A	U_S
	Channel 0x	Channel 1x		
Module power supply undervoltage				red
I/O power supply undervoltage			red	
No actuator supply			off	
Actuator short-circuit	red			

Tab. 34: LED display for diagnostics

5.1.3.4 IMPACT67 DO16 Modules

Error	LED at M12 Socket		LED Designation	
	Socket No. x		U_A	U_S
	Channel 0x	Channel 1x		
Module power supply undervoltage				red
I/O power supply undervoltage			red	
No actuator supply			off	
Actuator short-circuit	red	red		

Tab. 35: LED display for diagnostics

5.2 Sensor Power Supply

Power supply for the sensors is provided at the M12 sockets between pin 1 (+24V) and Pin 3 (0V).

5.2.1 Short-Circuit or Overload

The sensor power supply is protected by a self-resetting multifuse each slot. The maximum current draw for the sensor power supply is 200 mA per M12 slot. Note the derating in the drawing below:

Derating Sensor Power Supply

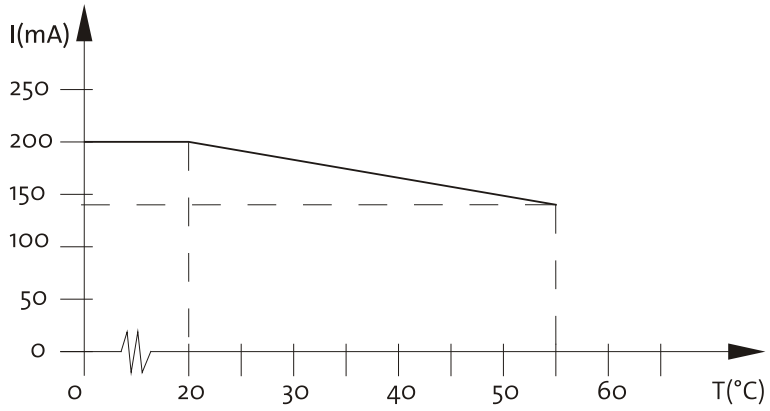


Fig. 18: Derating sensor power supply

In the event of a short-circuit or overload in the sensor supply, the following symptoms are observed on the IMPACT67 module:

- The diagnostic LEDs light up red on the associated M12 socket.
- The respective diagnostic data are transferred over the bus to the master
- All other inputs function correctly.

When an overload or short-circuit is rectified or the sensor supply is connected, the LEDs and diagnostic data are reset.

5.2.2 Sensor Power Supply Undervoltage

There are two levels of undervoltage detection:

1. Us < 18 V: In this case the module is still working but:

- The POWER - Us LED lights up red
- The respective diagnostic data are transferred to the scanner

2. Us < 12 V : In this case, the outputs have failed but bus communication still functions:

- the POWER UA LED goes out
- all outputs are reset to 0

3. Us < 6.5 V: In this case, the device shuts down.

5.3 Actuator Power Supply

5.3.1 Short-Circuit or Overload

In the event of an output short-circuit or overload, the following symptoms are observed on the IMPACT67 module:

- The diagnostic LEDs light up red on the associated M12 socket
- The output status LED extinguishes
- The respective diagnostic data are transferred over the bus to the master

In order to reactivate an output after a short circuit or overload has been corrected, the following procedure must be observed:

1. The output must first be set to “0”
2. and then to “1” again

5.3.2 Undervoltage

There are two levels of undervoltage detection:

1. U_A < 18 V: In this case the module is still working but:

- The POWER U_A LED lights up red
- The respective diagnostic data are transferred to the scanner

2. U_A < 12 V: In this case, the outputs are not longer functional.

- The POWER U_A LED goes out
- All outputs are reset to 0

5.4 Diagnostic Data via the Fieldbus

The following diagnostic data are reported:

- Sensor short-circuit group signal
- Actuator shutdown by channel and group signal
- Module power supply undervoltage (the sensor power supply is smaller than 18 V)
- Actuator power supply undervoltage (the actuator power supply is small than 18 V)

The group diagnosis consists of one byte. The corresponding bit for the error is set when the error occurs and is deleted as soon as the error is rectified.

5.4.1 Diagnostic Data of IMPACT67 DN

The diagnosis concerning the DeviceNet fieldbus is sent for all modules in the assembly instance 100 of Class 4. In addition, there is the option of requesting the diagnostic byte using the explicit message service.

Diagnostic Byte Format

Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3** (only modules with outputs)	**Bit 2** (only modules with inputs)	**Bit 1** (only modules with outputs)	**Bit 0** (all modules)
Unassigned				Actuator short-circuit diagnosis	Sensor short-circuit diagnosis	Actuator power supply undervoltage diagnosis	Sensor power supply undervoltage diagnosis

Tab. 36: Diagnostic byte format

Overview of Diagnostic Byte and Explicit Message Service

Module variants	**Byte in the I/O Data (Class 4 Instance 100)**	**Explicit Message Service**			**Data Format**
		Class	**Instance**	**Attribute**	
DI16	2	15	4	1	Byte
DI8 DO8	1	15	4	1	Byte
	2	15	7	1	Byte
DO8	0	15	4	1	Byte
	1	15	7	1	Byte
DO16	0	15	4	1	Byte
	1 and 2	15	7	1	Word

Tab. 37: Overview of diagnostic byte and explicit message service

6. Technical Data

6.1 Art. No. 55071 IMPACT67 DN DI16

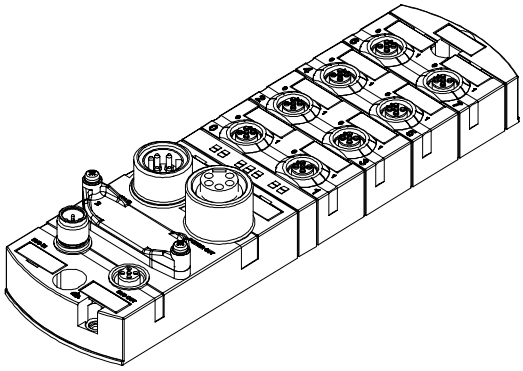
General

DeviceNet slave generic I/O module, housing IP67

with 16 inputs

[M12 slot, Pin 4] → 8 inputs

[M12 slot, Pin 2] → 8 inputs



EMC

EN 61000-4-2 ESD .....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF field .....: 10 V/m
EN 61000-4-4 Burst .....: ± 2 kV
EN 61000-4-5 Surge .....: asym./sym. ± 500 V (DC net input)
EN 61000-4-6 HF asymmetric .....: 10 V
EN 55011 Interference field strength .....: QP 40 dBµV/m (30 - 230 MHz),
..... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature .....: 0°C to +55°C
Storage temperature .....: -25°C to 70°C
Enclosure type according to IEC 60529 .....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Part 2-6 .....: 5 - 60 Hz: constant amplitude 0.35 mm,
..... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Part 2-27 .....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H) .....: 225 × 63 × 39 mm
Attachment distance .....: 208 mm
Weight .....: approx. 420 g

Bus Data

Transfer protocol .....: CAN, Layer 7 DeviceNet
Transfer rates .....: 125, 250, 500 Kbps
Electrical isolation .....: 500 V between bus and internal logic
..... by optocouplers
ODVA Vendor ID .....: 640dec
Operating modes .....: Poll, Change of State, Cycle
I/O data length input and diagnostics .....: 3 bytes

Connection Possibilities

Supply cable .....: 2 × connector 7/8" female / male connector
Data cable .....: 2 × M12 connector 5-pin
..... (female / male connector A-coded)
Inputs .....: 8 × 5-pin M12 connector
Maximum length of I/O cable.....: < 30 m

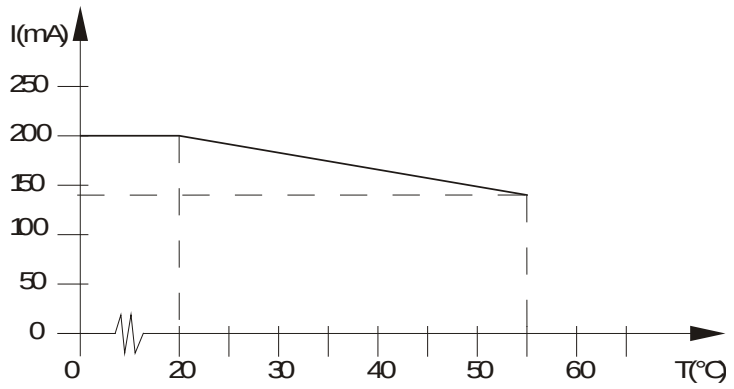
Power Supply

Operating voltage U_b over bus cable.....: 24 VDC
Operating voltage U_b range.....: 18 – 30 VDC
Current consumption U_b (without input/output).....: <= 100 mA
Voltage Us over 7/8” power in connector.....: 24 VDC
Voltage Us range .....: 18 – 30 VDC
Actuator supply 7/8” power in connector.....: max. 9 A
Sensor supply 7/8” power in connector .....: max. 9 A
Core cross-section.....: max. 1.5 mm²

Inputs

Number of inputs.....: 16
Input characteristics.....: EN 61131-2 Type 2
Supply for sensors .....: max. 200 mA per socket
Short-circuit protection for sensors .....: multifuse,
..... up to 100 mA load: automatic startup
..... from 100 mA load: a reset is required
Multifuse reaction time (time to trip) .....: 1s at IK >= 1 A and 23°C

Derating Sensor Supply



6.2 Art. No. 55072 IMPACT67 DN DI8 DO8

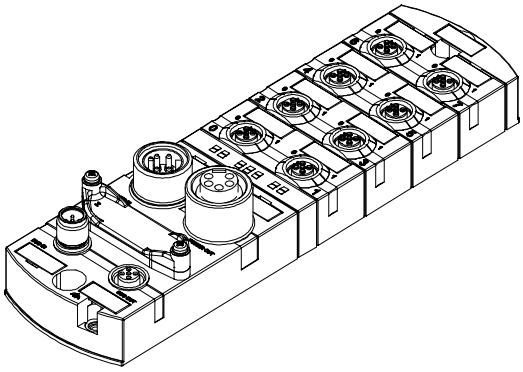
General

DeviceNet slave generic I/O module, housing IP67

with 8 inputs and 8 outputs

[M12 slot 4, 5, 6, 7; Pin 4 and Pin 2] → 8 inputs

[M12 slot 0, 1, 2, 3; Pin 4 and Pin 2] → 8 outputs



EMC

EN 61000-4-2 ESD .....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF field .....: 10 V/m
EN 61000-4-4 Burst .....: ± 2 kV
EN 61000-4-5 Surge .....: asym./sym. ± 500 V (DC net input)
EN 61000-4-6 HF asymmetric .....: 10 V
EN 55011 Interference field strength .....: QP 40 dBµV/m (30 - 230 MHz),
..... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature .....: 0°C to +55°C
Storage temperature .....: -25°C to 70°C
Enclosure type according to IEC 60529 .....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Part 2-6 .....: 5 - 60 Hz: constant amplitude 0.35 mm,
..... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Part 2-27 .....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H) .....: 225 × 63 × 39 mm
Attachment distance .....: 208 mm
Weight .....: approx. 420 g

Bus Data

Transfer protocol .....: CAN, Layer 7 DeviceNet
Transfer rates .....: 125, 250, 500 Kbps
Electrical isolation .....: 500 V between bus and internal logic
..... by optocouplers
ODVA Vendor ID .....: 640dec
Operating modes .....: Poll, Change of State, Cycle
I/O data length input and diagnostics .....: 3 bytes
I/O data length output .....: 1 byte

Connection Possibilities

Supply cable .....: 2 × connector 7/8" female / male connector
Data cable .....: 2 × M12 connector 5-pin
..... (female / male connector A-coded)
Inputs .....: 4 × 5-pin M12 connector
Outputs .....: 4 × 5-pin M12 connector
Maximum length of I/O cable.....: < 30 m

Power Supply

Operating voltage U_b over bus cable.....: 24 VDC
Operating voltage U_b range.....: 18 – 30 VDC
Current consumption U_b (without input/output).....: <= 100 mA
Voltage U_s / U_a over 7/8” power in connector.....: 24 VDC
Voltage U_s / U_a range.....: 18 – 30 VDC
Actuator supply 7/8” power in connector.....: max. 9 A
Sensor supply 7/8” power in connector.....: max. 9 A
Core cross-section.....: max. 1.5 mm²

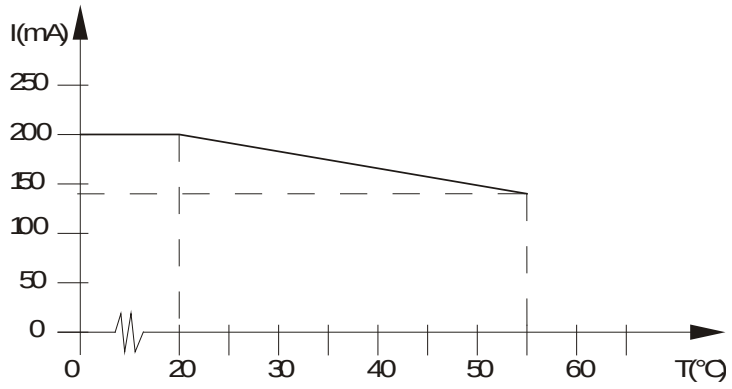
Outputs

Number of outputs.....: 8
Actuator current load.....: approx. 2 A per actuator
Cable length.....: with 0.75 mm² max. 10 m,
..... with 0.34 mm² max. 5 m
Core cross-section.....: M12 (max. 0.75 mm^2)
Switching frequency.....: approx. 50 Hz, 50% duty ratio
Switching frequency inductive load.....: approx. 10 Hz
Lamp load.....: max. 40 W

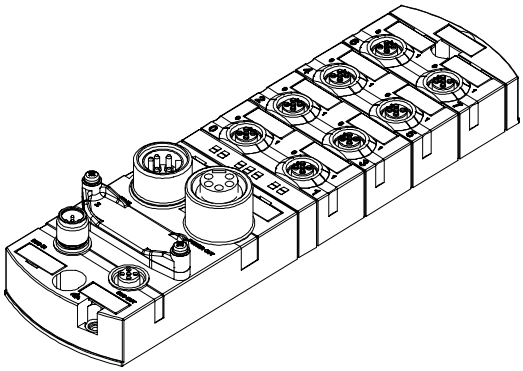
Inputs

Number of inputs.....: 8
Input characteristics.....: EN 61131-2, Type 2
Supply for sensors.....: max. 200 mA per socket
Short-circuit protection for sensors.....: multifuse,
..... up to 100 mA load: automatic startup
..... from 100 mA load: a reset is required
Multifuse reaction time (time to trip).....: 1s at IK >= 1 A and 23°C

Derating Sensor Supply



6.3 Art. No. 55073 IMPACT67 DN DO8



General

DeviceNet slave generic I/O module, housing IP67

with 8 outputs

[M12 slot, Pin 4] → 8 outputs

EMC

EN 61000-4-2 ESD .....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF field .....: 10 V/m
EN 61000-4-4 Burst .....: ± 2 kV
EN 61000-4-5 Surge .....: asym./sym. ± 500 V (DC net input)
EN 61000-4-6 HF asymmetric .....: 10 V
EN 55011 Interference field strength .....: QP 40 dBµV/m (30 - 230 MHz),
..... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature .....: 0°C to +55°C
Storage temperature .....: -25°C to 70°C
Enclosure type according to IEC 60529 .....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Part 2-6 .....: 5 - 60 Hz: constant amplitude 0.35 mm,
..... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Part 2-27 .....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H) .....: 225 × 63 × 39 mm
Attachment distance .....: 208 mm
Weight .....: approx. 420 g

Bus Data

Transfer protocol .....: CAN, Layer 7 DeviceNet
Transfer rates .....: 125, 250, 500 Kbps
Electrical isolation .....: 500 V between bus and internal logic
..... by optocouplers
ODVA Vendor ID .....: 640dec
Operating modes .....: Poll, Change of State, Cycle
I/O data length input and diagnostics .....: 2 bytes
I/O data length output .....: 1 byte

Connection Possibilities

Supply cable .....: 2 × connector 7/8" female / male connector
Data cable .....: 2 × M12 connector 5-pin
..... (female / male connector A-coded)
Outputs .....: 8 × 5-pin M12 connector
Maximum length of I/O cable.....: < 30 m

Power Supply

Operating voltage U_b over bus cable.....: 24 VDC
Operating voltage U_b range.....: 18 – 30 VDC
Current consumption U_b (without input/output).....: <= 100 mA
Voltage U_s / U_a over 7/8” power in connector.....: 24 VDC
Voltage U_s / U_a range.....: 18 – 30 VDC
Actuator supply 7/8” power in connector.....: max. 9 A
Sensor supply 7/8” power in connector.....: max. 9 A
Core cross-section.....: max. 1.5 mm²

Outputs

Number of outputs.....: 8
Actuator current load.....: approx. 2 A per actuator
Cable length.....: with 0.75 mm² max. 10 m,
..... with 0.34 mm² max. 5 m
Core cross-section.....: M12 (max. 0.75 mm^2)
Switching frequency.....: approx. 50 Hz
Switching frequency inductive load.....: approx. 10 Hz
Lamp load.....: max. 40 W

6.4 Art. No. 55074 IMPACT67 DN DO16

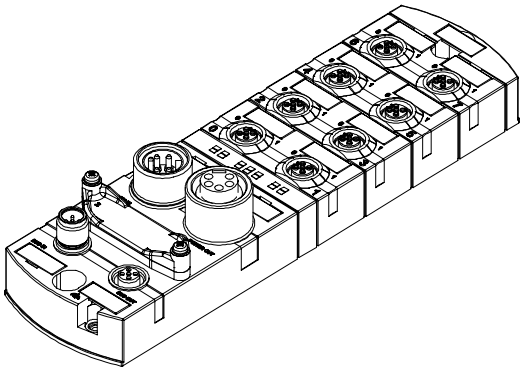
General

DeviceNet slave generic I/O module, housing IP67

with 16 outputs

[M12 slot, contact 4] → 8 outputs

[M12 slot, contact 2] → 8 outputs



EMC

EN 61000-4-2 ESD .....: Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF field.....: 10 V/m
EN 61000-4-4 Burst .....: ± 2 kV
EN 61000-4-5 Surge .....: asym./sym. ± 500 V (DC net input)
EN 61000-4-6 HF asymmetric .....: 3 V
EN 61000-4-8 Magnetic field 50 Hz .....: 30 A/m
EN 55011 Interference field strength .....: QP 40 dBµV/m (30 - 230 MHz),
..... QP 47 dBµV/m (230 - 1000 MHz) (class A)

Ambient Conditions

Operating temperature .....: 0°C to +55°C
Storage temperature.....: -25°C to 70°C
Enclosure type according to IEC 60529 .....: IP 67

Mechanical Ambient Conditions

Oscillation according to EN 60068 Part 2-6.....: 5 - 60 Hz: constant amplitude 0.35 mm,
..... 60 – 150 Hz: constant acceleration 5 g
Shock according to EN 60068 Part 2-27 .....: Amplitude 15 g, 11 ms duration

Miscellaneous

Dimensions (L × W × H).....: 225 × 63 × 39 mm
Attachment distance .....: 208 mm
Weight .....: approx. 420 g

Bus Data

Transfer protocol .....: CAN, Layer 7 DeviceNet
Transfer rates .....: 125, 250, 500 Kbps
Electrical isolation.....: 500 V between bus and internal logic
..... by optocouplers
ODVA Vendor ID .....: 640dec
Operating modes.....: Poll, Change of State, Cycle
I/O data length input and diagnostics .....: 3 bytes
I/O data length output.....: 2 bytes

Connection Possibilities

Supply cable .....: 2 × connector 7/8" female / male connector
Data cable .....: 2 × M12 connector 5-pin
..... (female / male connector A-coded)
Inputs and diagnosis inputs.....: 8 × 5-pin M12 connector
Maximum length of I/O cable.....: < 30 m

Power Supply

Operating voltage U_b over bus cable.....: 24 VDC
Operating voltage U_b range.....: 18 – 30 VDC
Current consumption U_b (without input/output).....: <= 100 mA
Voltage U_s / U_a over 7/8” power in connector.....: 24 VDC
Voltage U_s / U_a range.....: 18 – 30 VDC
Actuator supply 7/8” power in connector.....: max. 9 A
Sensor supply 7/8” power in connector.....: max. 9 A
Core cross-section.....: max. 1.5 mm²

Outputs

Number of outputs.....: 16
Actuator current load.....: approx. 0.5 A per actuator
Cable length.....: with 0.75 mm² max. 10 m,
..... with 0.34 mm² max. 5 m
Core cross-section.....: M12 (max. 0.75 mm^2)
Switching frequency.....: approx. 50 Hz 50% duty ratio
Switching frequency inductive load.....: approx. 10 Hz duty ratio
Lamp load.....: max. 10 W

Abbreviations

Actuator short-circuit	Short-circuit or overload at an output results in output switchoff. This error is signaled to the DeviceNet Master via the useful data. A red LED indicates the error at the associated M12 socket. There is no automatic output restart. It is necessary to switch off the output via the controller after the cause of the error is rectified. This clears the short-circuit memory.
DI	Digital Input
DIN	German standards institute
DN	DeviceNet
DO	Digital Output
EN	European Standard
EC	European Community
EMC	Electromagnetic Compatibility
IEC	International Electrotechnical Commission
ISO	International Standards Organization
LED	Light Emitting Diode
MS	Module Status
NS	Network Status
OSI	Open Systems Interconnection
Sensor short-circuit	Short-circuit or overload at Pin 1 of the M12 socket trips the self-resetting circuit-breaker. Every M12 socket has a separate circuit-breaker. A red LED indicates the error at the associated M12 socket. This error is signaled to the DeviceNet Master via the useful data. After the error is rectified, the sensor power supply is restarted automatically

PLC	Programmable Logic Controller
Undervoltage	The voltages of the sensor power supply and actuator power supply are detected separately. If a voltage of 18 VDC is exceeded, this error is signaled to the DeviceNet Master by the useful data. If there is a sensor power supply undervoltage, the LED labeled "US Error" lights up. If there is an actuator power supply undervoltage, the LED labeled "UA Error" lights up

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